Soybean Rust Plan

Protection

Detection

Response

Recovery

Technical Support
- Forecasting Systems
- Access to Fungicides
- Resistant/Tolerant Varieties

Outreach
RECOVERY PLAN

The occurrence of ASBR will have an impact on the production of soybeans in the United States. Because of the severity of the disease and costs to prevent or control field infections it is likely the production of soybeans in southern-most states could become unprofitable. Growers can expect an increase in production costs related to fungicides and their application to protect the crop.

It is suggested that growers consider removing non-cultivated soybean rust host material from field borders. The removal of this material will reduce the amount of hosts available, thereby reducing the amount of available host material to initiate an infection while decreasing the availability of sites for inoculum buildup.

The best long term strategy for minimizing the effects of soybean rust in the United States is in the development of resistant/tolerant varieties. There are thousands of plant lines of soybean in germplasm repositories and screening for soybean resistance has been on-going for several years in other countries and the United States in the containment facilities at the ARS Foreign Disease-Weed Science Research Unit in Ft. Detrick, Maryland. However, the availability of cultivars with good resistance and other characters desired in soybean for commercial production is still five to seven years away.

Fungicides have been shown to be effective in controlling soybean rust in Zimbabwe, South Africa and Brazil. An effort is underway to obtain a State Quarantine Exemption for seven fungicides by South Dakota and Minnesota with USDA assistance. Several chemical companies that already have fungicides registered for soybeans have relabeled their products to include control for Phakopsora sp. in soybeans and other leguminous crops.

Once an effective fungicide or fungicides, are available for use by growers, a recommendation will be made to extension scientists, crop consultants and growers to have sentinel plantings placed strategically in soybean growing areas that would allow for early detection of the disease, which would facilitate producer decisions about protectant applications of fungicides. Since ASBR manifests primarily on maturing plants, the sentinel plantings should be made about 3 weeks before the commercial crop is planted. This provides an opportunity to observe the first signs of the disease on the sentinels thereby allowing time to effect control of the pathogen in commercial plantings before the disease becomes epidemic. An early protectant application of fungicide will be needed around flowering time when sentinel plants are infected. Subsequent applications may be necessary as the crop matures and the disease begins to intensify.
Dr. Clive Levy, with the Commercial Farmer’s Union of Zimbabwe reported that once an infestation of soybean rust is detected, if early enough, effective control was obtained with carefully timed fungicide applications. Detection early in the season with properly timed application of fungicides appears to present the best alternative for controlling soybean rust in the United States. In areas of high rust severity, the first application is at first flowering and then two more applications in 21 day intervals thereafter. In areas with lower severity, the last application is not necessary. In Zimbabwe some farmers found a schedule of first applications 50 days after planting, then at 70 and 90 days after planting. In all cases, but especially in the first applications, it is most effective to apply the fungicides in such a manner that the lower canopy is receives treatment.

Once the disease becomes established in the United States, a valuable tool to assist in the management of ASBR would be predictive models that forecast the probability of occurrence and movement of the disease throughout the nation’s soybean production area. This information would be extremely useful to producers and others for surveillance and monitoring activities and timely applications of fungicides.

Through cooperation, education, and training growers will be provided with the tools to make informed decisions about managing ASBR and soybean production.

Components of Recovery include:
- Technical Support
  - Forecasting System
  - Access to fungicides
  - Resistant/Tolerant Varieties
- Outreach

**TECHNICAL SUPPORT**

Producers will require short term assistance in minimizing the impact of ASBR in commercial production areas. PPQ, affected states and the chemical companies can play a role for developing forecasting systems and obtaining exemptions or registrations for fungicides. Likewise, PPQ and the soybean industry will collaborate in the development of resistant or tolerant varieties to minimize production losses and reduce fungicide use.

**Forecasting**

The establishment of ASBR will have an effect on production of soybeans throughout the continental United States. The disease will become endemic in many parts of our country while other areas of the United States will experience seasonal occurrences of the disease. An early warning or forecasting system would provide producers with a decision-making tool for field control to better manage their crop production and enhance changes for reducing yield losses.
• CPHST in cooperation with ARS and CSREES will review existing air current data in an effort to correlate potential dispersal of the disease from known infected areas to other areas in the United States.
• CPHST in cooperation with ARS and CSREES will support development of an early warning system to assist producers in management of the disease.

Access to Fungicides
Currently there are only two fungicides (Quadris=azoxystrobin and Bravo=chlorothalonil) registered for ASBR control in the United States. It is important that several fungicides be available in the event they are needed for soybean rust control so that resistance development is minimized.

We have addressed this issue by:
• PPQ and the USDA Office of Pest Management Policy, in collaboration with the Environmental Protection Agency and industry, have pursued obtaining label revisions and/or approvals for U.S. registered fungicides for use against ASBR; and
• APHIS, the USDA Office of Pest Management Policy, the South Dakota University, and the Minnesota Department of Agriculture in collaboration with the Environmental Protection Agency, scientists, and industry will develop technical application information (dosage, rate, method, etc.).

Resistant/Tolerant Varieties
The scientific community and industry agree that the development and use of resistant/tolerant varieties is the long range goal to overcome production losses associated with ASBR. To this end:
• ARS and CSREES with cooperation of seed companies will develop commercially acceptable rust resistant or tolerant soybean varieties to minimize the economic impact of the establishment of ASBR on the industry.
  o Identify resistant germplasm from international sources and evaluate resistance susceptibility at other international locations;
  o Isolate and clone genes expressed from resistant soybean varieties;
  o Expand studies on genetic diversity of the pathogen in order to assess variability within pathogen populations and evolution of new races of the pathogen; and
  o Determine the potential pathway within the U.S. soybean production region for development of resistant varieties.

OUTREACH
The successful recovery from the introduction of soybean rust will be a scientific and communication challenge. Producers and the industry as a whole will have many questions and concerns especially regarding management of the disease. In order to be as responsive as possible:
• CSREES, with cooperation from APHIS and ARS, will develop information for use in preparing technical training programs and program aides describing actions to reduce crop damage;
• CSREES will identify and activate distribution systems to communicate technical information;
STRATEGIC PLAN TO MINIMIZE THE IMPACT OF THE INTRODUCTION AND ESTABLISHMENT OF SOYBEAN RUST ON SOYBEAN PRODUCTION IN THE UNITED STATES

ASIAN SOYBEAN RUST
*Phakopsora pachyrhizi*